Levees breach simulation by dsm2-DB

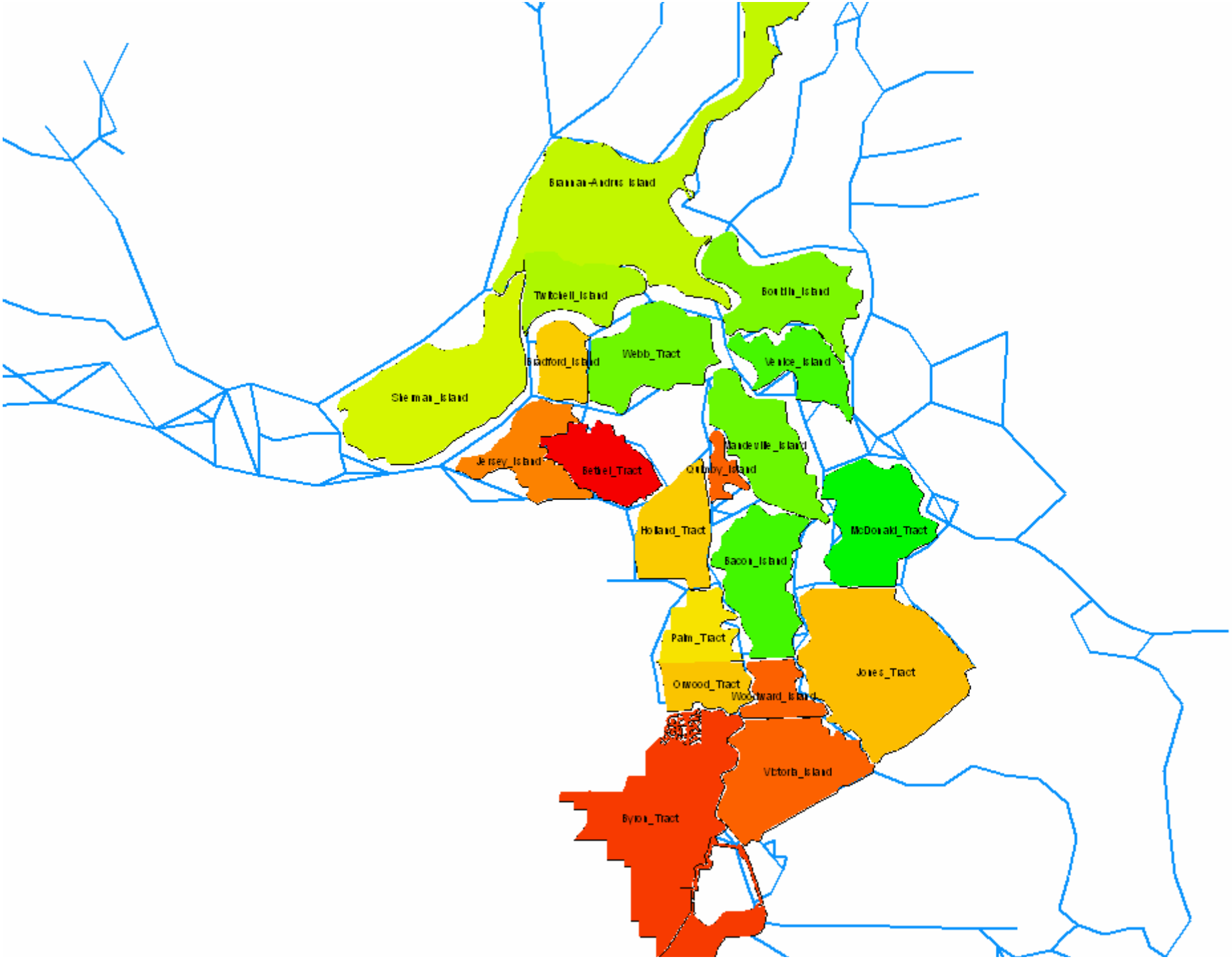
Preliminary results and comparisons with RMA

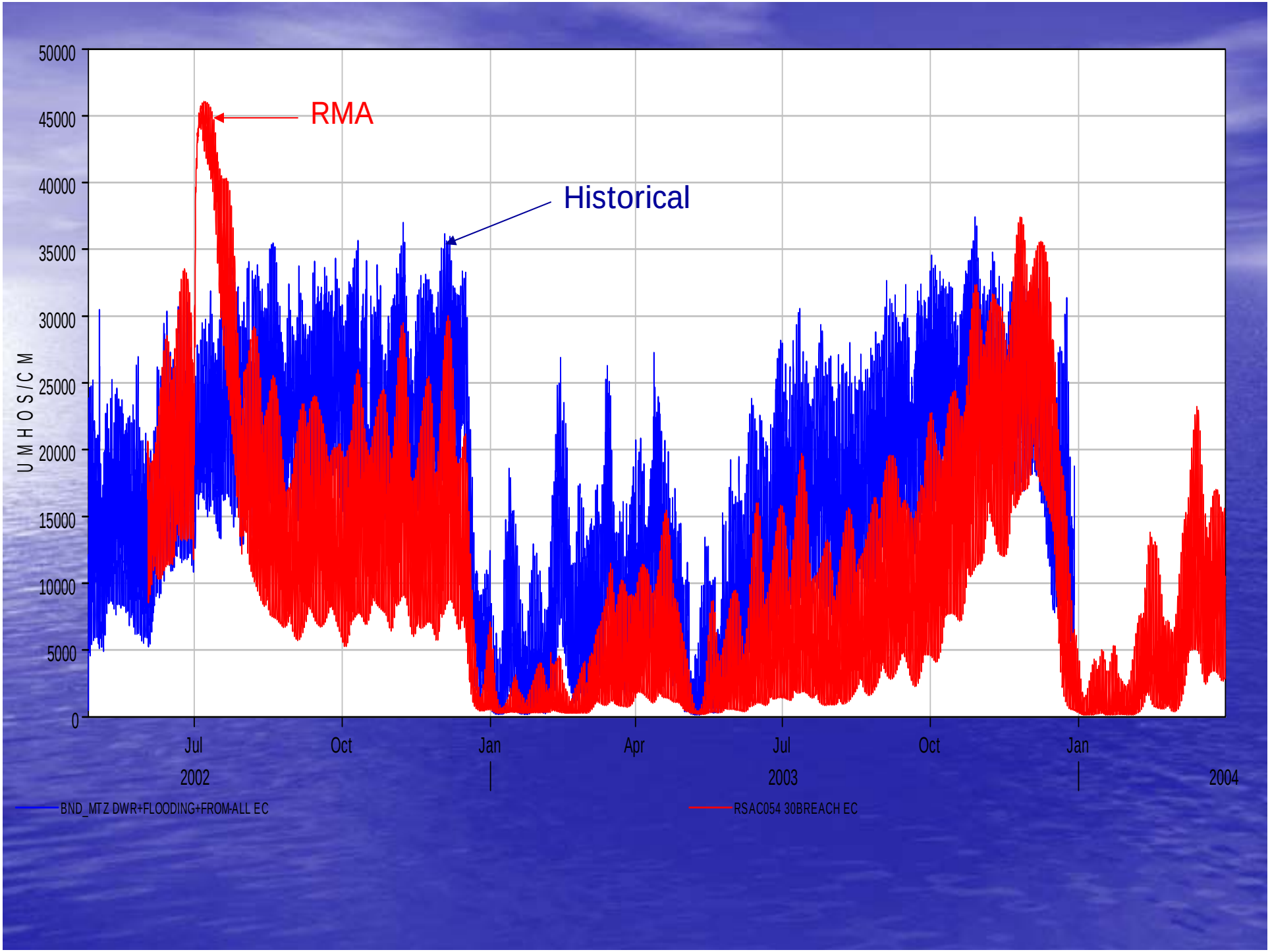
Purposes:

- Compare DSM2 with RMA in island flooding study
- Find out what input assumptions affect final water quality results

Model setting:

- Period: Jun/2002-Dec/2003
- Breaches: Total 32,similar width as RMA
- Island flooded:20,same as RMA 30 breaches case
- Grid: Standard delta grid with flooded island as reservoir with uniform depth
- Boundary:
  - Historical flow, stage and EC
  - Historical flow, stage and EC time series generated by RMA.


Brannan-Andrus Island
Twitchell_Island
Bouldin_Island
Webb_Tract
Bradford_Island
Venice_Island
Sherman_Island
Mandeville_Island
Jersey_Island
Bethel_Tract
Chipps_Island
Holland_Tract
McDonald_Tract
Bacon_Island
Palm_Tract
Jones_Tract
Orwood_Tract
Woodward_Island
Victoria_Island
Byron_Tract


RMA
Historical
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
U M H O S/C M
Jul
2002
Oct
Jan
Apr
Jul
2003
Oct
Jan
2004
BND_MTZ DWR+FLOODING+FROMALL EC
RSAC054 30BREACH EC

Difference between the two models

- Different salinity boundary location:

  RMA: Golden Gate, constant EC,50,000 umhos/cm.

  DSM2-DB:Martinez point, historical EC

- Different breaches open schedule:

  RMA: all breaches open simultaneously and instaneously at 7/1/2002,00:00

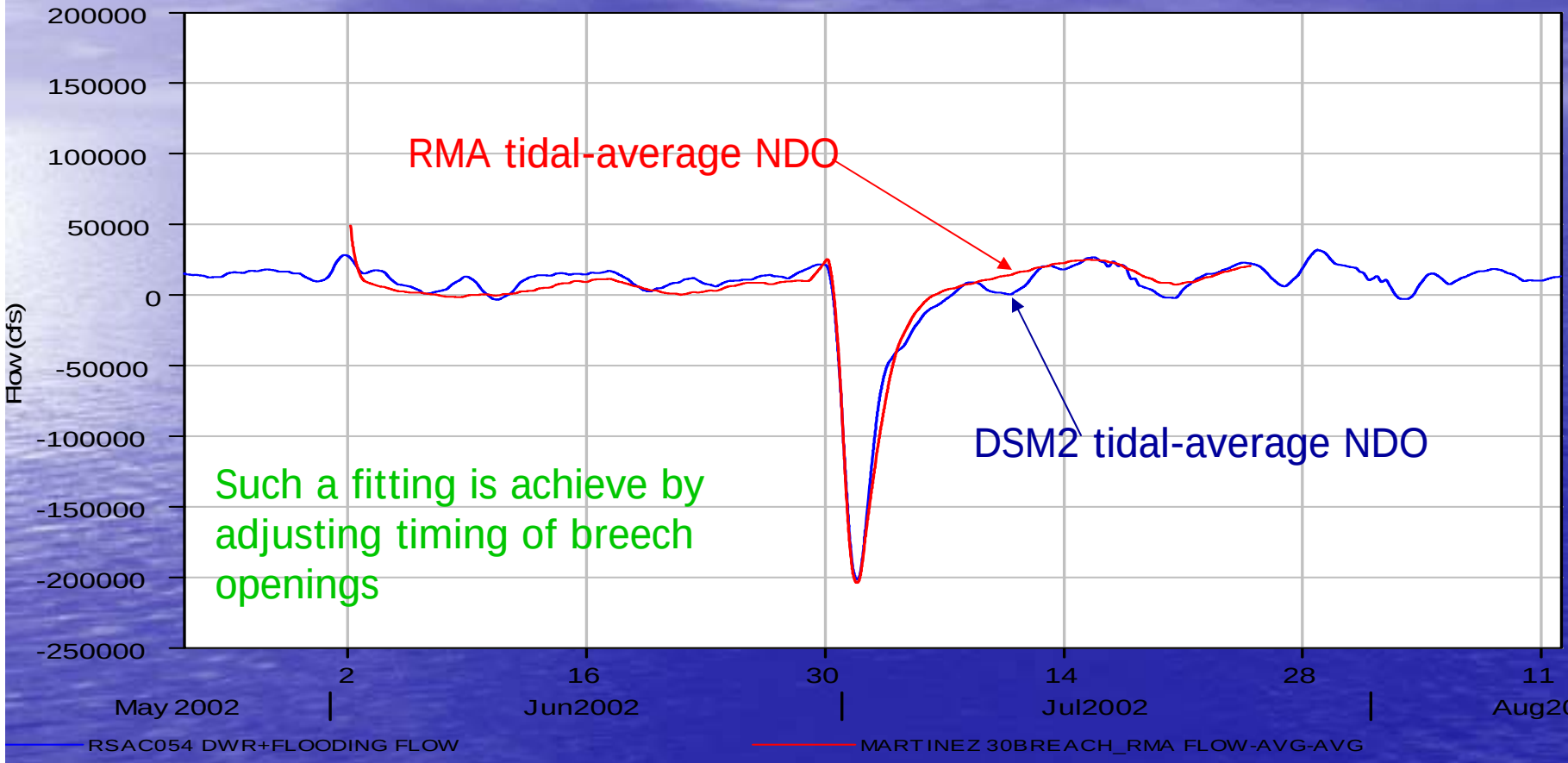
  DSM2-DB: open gradually from 6/30/02,22:00 to 7/1/2002,21:00

Difference between the two models (continue)

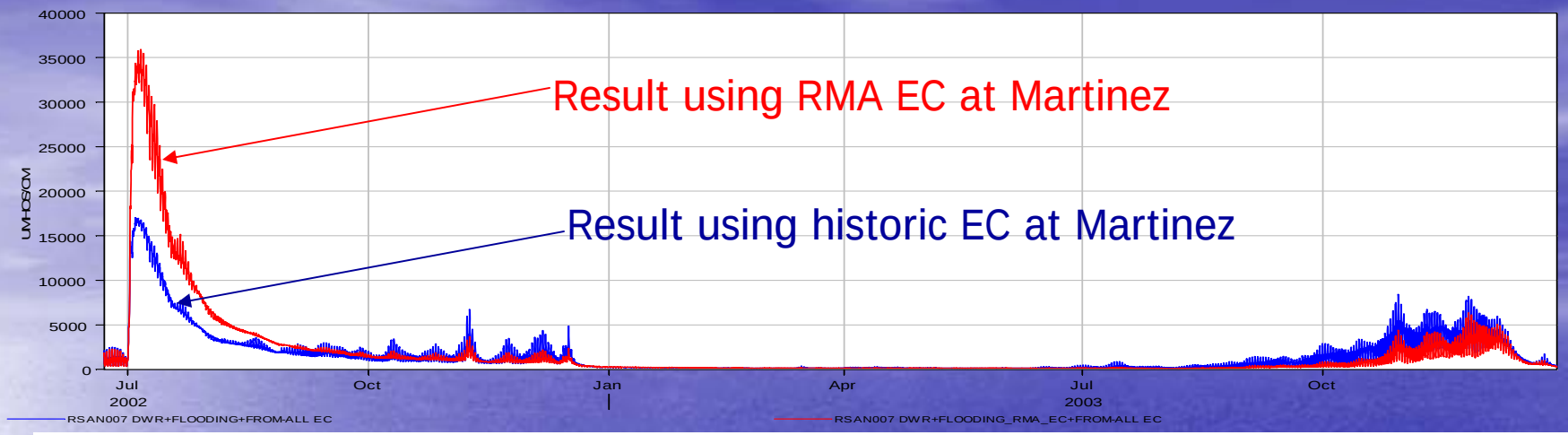
- Some differences in estimated volumes of islands below sea level
- DSM2-DB is a one dimensional model, RMA is two dimensional.

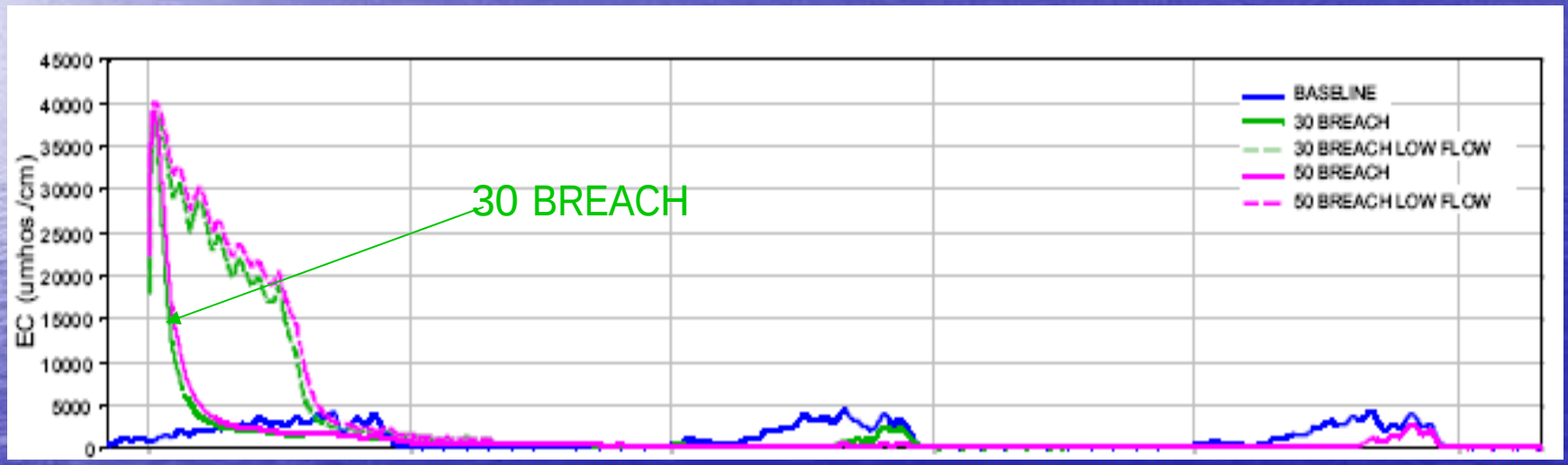
Phase issues:

- Maintain flow and EC boundary in phase of each other are important if impose EC time series generated by RMA on Martinez
- The opening schedule of breaches in DSM2 are adjusted to achieve a tidal-average flow passing Martinez, which has the same timing as that of RMA.

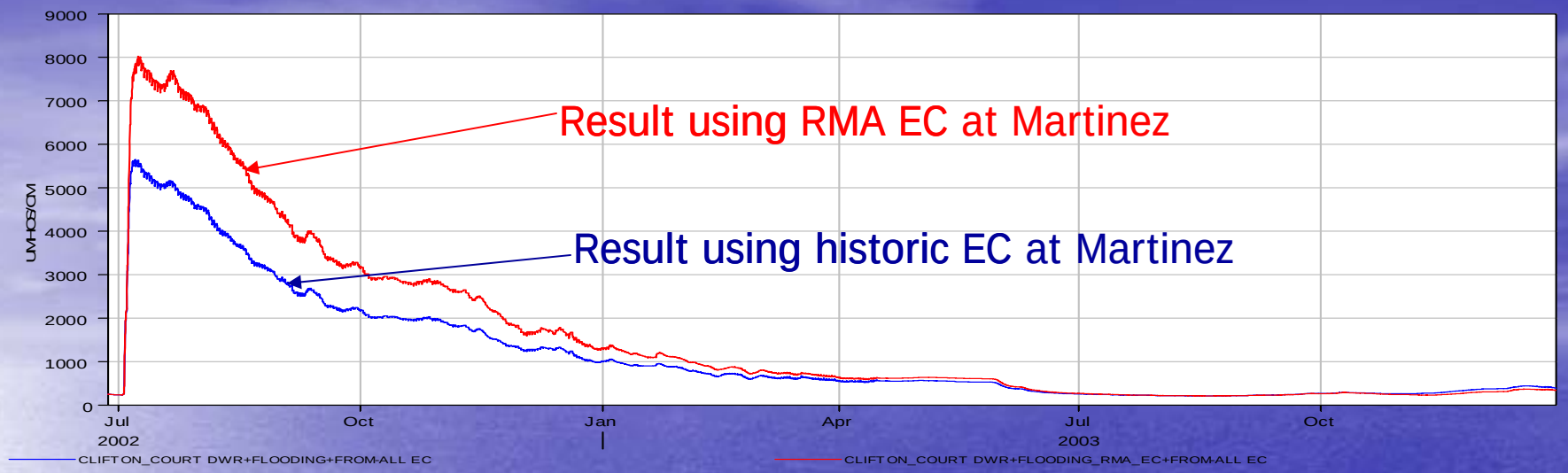

200000
150000
100000
50000
0
-50000
-100000
-150000
-200000
-250000
Flow (cfs)
RMA tidal-average NDO
DSM2 tidal-average NDO
Such a fitting is achieve by adjusting timing of breech openings
2
16
30
14
28
11
May 2002
Jun2002
Jul2002
Aug2002
RSAC054 DWR+FLOODING FLOW
MARTINEZ 30BREACH_RMA FLOW-AVG-AVG

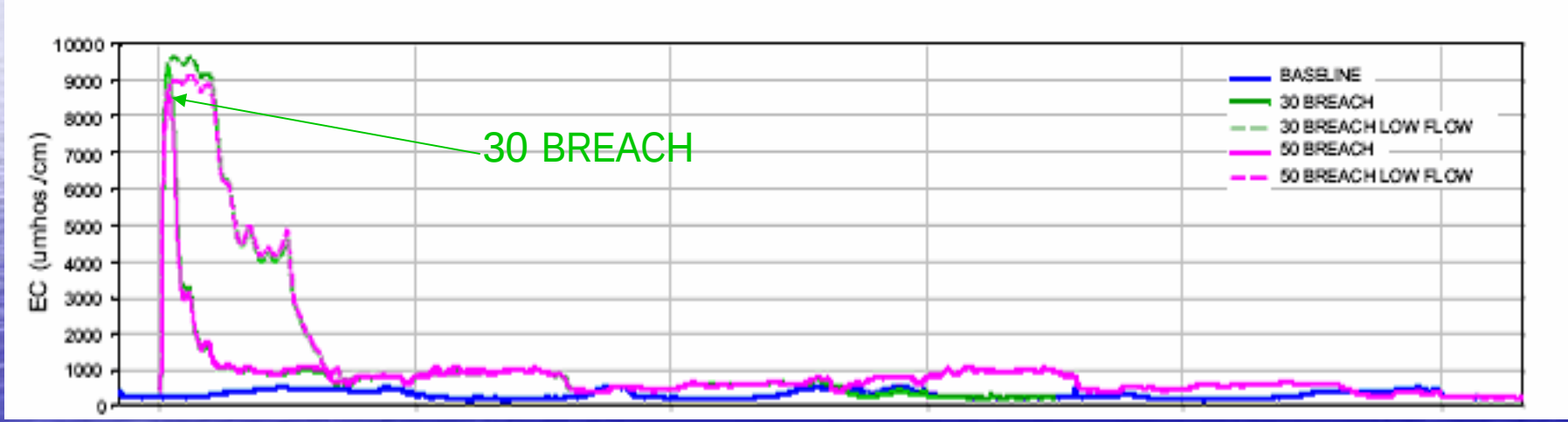
Some plots of EC time series



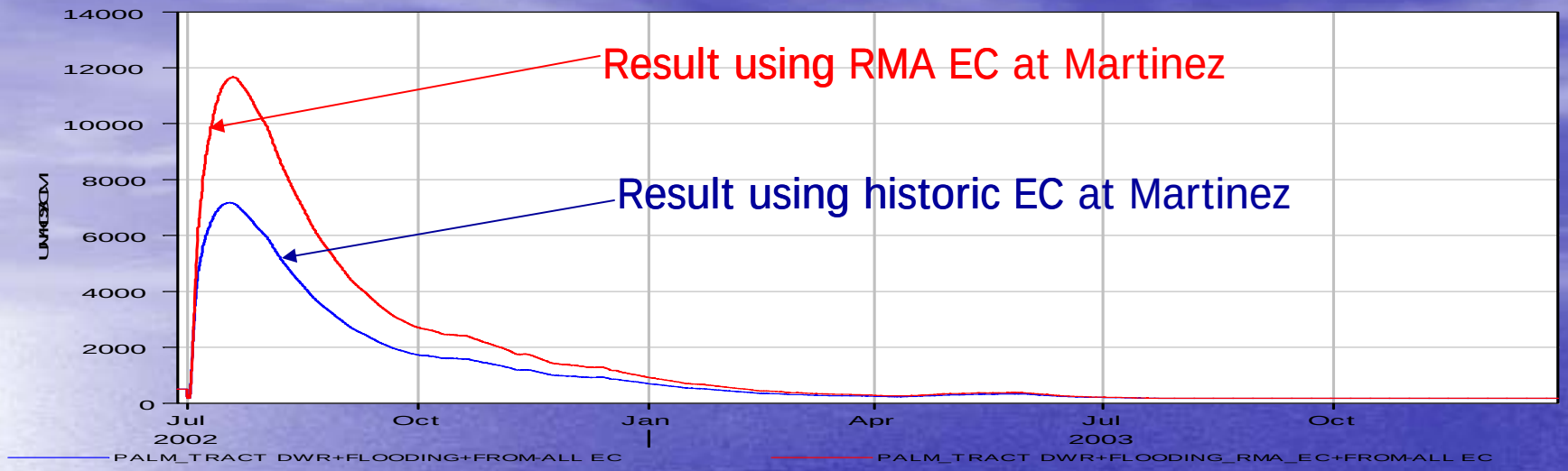


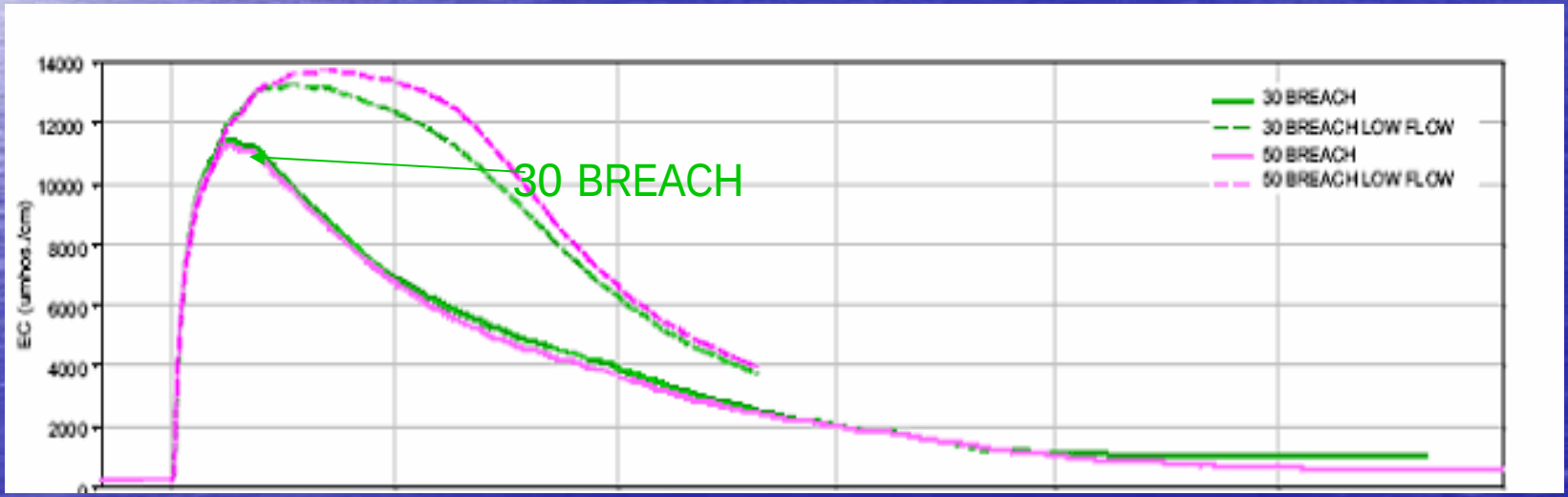
Comparison EC output at Antioch (Top: DSM2, Lower: RMA)





Comparison EC output at Clifton-Court (Above: DSM2, Lower: RMA)





Comparison EC output at Palm Tract (Above: DSM2, Lower: RMA)

Some observations

- DSM2 simulation results are sensitive to:
  - Estimation of island volumes
  - Opening schedule of breaches (phase issue)
  - EC boundary used